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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/738,268	12/15/2000	Dennis K. Lieu	8864/23	1640

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BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60611

EXAMINER
WAKS, JOSEPH

ART UNIT	PAPER NUMBER
2834	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/738,268	LIEU ET AL.	
	Examiner	Art Unit	
	Joseph Waks	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 December 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-24,28-37 and 49-88* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *30-37 and 57* is/are allowed.

6)☒ Claim(s) *1,3-18,20-24,50-53 and 58-87* is/are rejected.

7)☒ Claim(s) *19,28,29,54-56 and 88* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1, 4-10, 18, 20-24, 52, 53, 59-87** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katakura et al. (US 5,241,229)** in view of **Nakamura et al. (US 5,459,190)** and **Aharoni (US 4,390,649)**.

Katakura et al. disclose in Figures 1 and 2 a spindle motor having a baseplate 11 or 31, a shaft 14 or 34 supported by the baseplate, a stator assembly spaced from the baseplate and including a laminated core 18 or 38 having poles surrounded by windings 19 or 39 and rigidly attached to the baseplate with support member 12 or 32, a molded material 22 or 42 secured to the baseplate in the space between the stator and the baseplate, encapsulating the windings and being in intimate contact with the baseplate, and a hub 35 supported by the shaft and having a magnet 37. However, **Katakura et al.** fail to disclose the thermoplastic material having a modulus of elasticity of 1,000,000 psi at 25°C.

Nakamura et al. disclose in Figure 1 and column 3, lines 44-64 a magnetic drive with a base 11, a stator assembly spaced from the baseplate and including a laminated core 9 having poles surrounded by windings 10, an injection molded material 6 secured to the base in the space between the stator and the base and having linear thermal expansion of $1.97^{*}\ 10^{-5}$/°C or

1.09* 10^{-5} in/in °F and thermal conductivity of 0.0040 to 0.0055 cal/s*°C or 1.67 watts/m°K (Re column 5, Table 1) for the purpose of protecting the motor from adverse working conditions such as mechanical stresses due to a pulsating torque and heat generated during motor operation (Re column 1, lines 21-30) while avoiding long curing time or deterioration of the insulating properties of the material caused by de-bonding resulted by vibration or thermal cycles the material is exposed during operation (Re column 1, lines 31-67 and column 2, lines 1-25).

Aharoni discloses in column 8 table VII thermoplastic materials having modulus of elasticity between 1.00-1.38 million psi.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the magnetic drive as taught by **Katakura et al.** with the thermoplastic in lieu of thermosetting material as taught by **Nakamura et al.** for the purpose of protecting the motor from adverse working conditions such as mechanical stresses due to a pulsating torque and heat generated during motor operation while avoiding long curing time or deterioration of the insulating properties of the material caused by de-bonding resulted by vibration or thermal cycles the material is exposed during operation and to and dissipate the heat from the stator.

It would have been further obvious to one having ordinary skill in the art at the time the invention was made to select the vibration dampening thermoplastic material having specific dampening characteristics and elasticity (such as the material disclosed by **Aharoni**) for the specific operating conditions or the dielectric strength for the specific power supply, since it has been held to be within the general skill of a worker in the art to select a known material on the

basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

3. **Claims 3, 13** and **53** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katakura et al. US 5,241,229)** in view of **Nakamura et al. (US 5,459,190)** and **Aharoni (US 4,390,649)** as applied to claim 1 above and further in view of **Dunfield et al. (US 5,694, 268)**.

The combined drive discloses all elements essentially as claimed. However, it does not disclose the baseplate made of aluminum and the rotor magnet being positioned inside the stator assembly.

Dunfield et al. (US 5,694, 268) discloses in Figure 9 and Figures 1-6 a baseplate 266 made of aluminum and the rotor magnet 70 or 166 positioned internally in the stator as a well known in the art material and magnets configuration used in spindle motors.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the combined drive and to provide the baseplate made of aluminum and the rotor positioned internally in the stator as taught by **Dunfield et al. (US 5,694, 268)** for the purpose of providing a light and sturdy plate having good thermal conductivity and to save the amount of expensive magnetic material (like rare earth magnets for example).

4. **Claims 11** and **12** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katakura et al. US 5,241,229)** in view of **Nakamura et al. (US 5,459,190)** and **Aharoni (US 4,390,649)** as applied to claim 10 above and further in view of **Kuwert et al. (US 5,986,365)**.

The combined drive discloses all elements essentially as claimed. However, it does not disclose the aluminum baseplate having a plurality of holes through, and the hub comprising an

outer member having an inside aperture with a steel ferrule inside the aperture with a bearing interposed between the shaft and the ferrule.

Kuwert et al. discloses in the Figure a drive with a baseplate 1 provided with a plurality of holes 13 filled with thermoplastic material 16 for the purpose of locking and securing the material in the holes and a ferrule inside an aperture in the rotor hub with a bearing interposed between the ferrule and the shaft that is a well known in the art spindle motor structure that allows to reduce the weight of the rotor while providing sufficient strength for supporting the bearing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the combined drive and to provide the baseplate having a plurality of holes through and the ferrule inside an aperture in the rotor hub with a bearing interposed between the ferrule and the shaft as taught by **Kuwert et al. (US 5,694, 268)** for the purpose of locking and securing the material in the holes and to provide the well known in the art spindle motor structure that allows to reduce the weight of the rotor while providing sufficient strength for supporting the bearing.

It would have been further obvious to one having ordinary skill in the art at the time the invention was made to provide the hub made of aluminum and the ferrule made of steel, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

5. **Claims 14-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katakura et al. US 5,241,229)** in view of **Nakamura et al. (US 5,459,190)** and **Aharoni (US 4,390,649)** as applied to claim 10 above and further in view of **Moir et al. (US 5,5,949)**.

The combined drive discloses all elements essentially as claimed. However, it does not disclose the hub comprising an outer member having an inside aperture with a ferrule inside the aperture having magnets attached to the ferrule and upper and lower bearings interposed between the shaft and the ferrule and in direct contact with the ferrule.

Moir et al. discloses in the Figure 5 a spindle motor baseplate and a ferrule 26 inside an aperture in a rotor hub 32, upper and lower bearings 22 and 24 interposed between the ferrule and the shaft 20 and in direct connection with the ferrule, and the permanent magnets 28 attached to the ferrule, for the purpose of proper alignment of the bearings and to minimize the eccentricity in rotation center of the rotor.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the combined drive and to provide the hub comprising an outer member having an inside aperture with a ferrule inside the aperture having magnets attached to the ferrule and upper and lower bearings interposed between the shaft and the ferrule and in direct contact with the ferrule as taught by **Moir et al.** for the purpose of providing the well known in the art spindle motor structure that allows to reduce the weight of the rotor while providing sufficient strength for supporting the bearing, to minimize the eccentricity in rotation center of the rotor.

6. **Claims 17** and **58** rejected under 35 U.S.C. 103(a) as being unpatentable over **Katakura et al. US 5,241,229)** in view of **Nakamura et al. (US 5,459,190)** and **Aharoni (US 4,390,649)**

as applied to claim 10 and further in view of **Moir et al. (US 5,5,949)** as applied to claim 14, and furthermore in view of **Mori et al. (US 5,325,004)**.

The combined drive discloses all elements essentially as claimed. However, it does not disclose the aluminum hub and the steel ferrule inside the hub aperture.

Mori et al. discloses in the Figures 1 and 4 a drive with an aluminum baseplate 14 and a steel ferrule 122 inside an aperture in the aluminum rotor hub 116 with a bearing 134 interposed between the ferrule and the shaft 110 for the purpose of minimizing the eccentricity in rotation center of the rotor and enclosing the magnetic flux circuit with the ferrule used also as a back iron for the magnet.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the combined drive and to provide the ferrule inside an aperture in the rotor hub with a bearing interposed between the ferrule and the shaft as taught by **Mori et al.** for the purpose of providing the well known in the art spindle motor structure that allows to reduce the weight of the rotor while providing sufficient strength for supporting the bearing, to minimize the eccentricity in rotation center of the rotor and to enclose the magnetic flux circuit with the ferrule used also as a back iron for the magnet.

7. **Claims 49-51** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Papst (US 6,195,226)** in view of **Nakamura et al. (US 5,459,190)**.

Papst discloses a spindle motor comprising a baseplate 3, a shaft supported by the baseplate, a coreless stator comprising windings 22 encapsulated in plastic material 23, a hub 9 having magnet 26and a flux return ring 27 wherein the stator is located between the magnet and the flux ring. However, **Papst** does not disclose the plastic being a thermoplastic material.

Nakamura et al. Disclose the stator winding encapsulated in thermoplastic material for the purpose of for the purpose of protecting the stator from adverse working conditions such as mechanical stresses due heat generated during motor operation (Re column 1, lines 21-30) while avoiding long curing time.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the motor as taught by **Pabst** and to provide the coreless stator with windings encapsulated in thermoplastic material as taught by **Nakamura et al.** for the purpose of protecting the stator from adverse working conditions such as mechanical stresses due heat generated during motor operation while avoiding long curing time as would be required by a thermosetting resin for example.

Allowable Subject Matter

8. **Claim 19, 28, 29, 54-56** and **88** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. **Claims 30-37**, and **57** are allowed.

The feature of the baseplate comprising a stiff thermoplastic material having modulus of elasticity at least 1,000,000 psi and a metal plate substantially encapsulated in the thermoplastic material, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Response to Arguments

10. Applicant's arguments filed December 9, 2002 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, **Katakura et al.** disclose the molded material substantially encapsulating the stator windings and contacting the baseplate such that the windings, core and baseplate are rigidly fixed together. **Nakamura et al.** teach the motor using the injection molded material secured to the base in the space between the stator and the base for the purpose of protecting the motor from adverse working conditions such as mechanical stresses due to a pulsating torque and heat generated during motor operation while avoiding long curing time or deterioration of the insulating properties of the material caused by de-bonding resulted by vibration or thermal cycles the material is exposed during operation and to and dissipate the heat from the stator. **Aharoni** discloses in column 8 table VII thermoplastic materials having modulus of elasticity between 1.00-1.38 million psi. In combination **Katakura et al., Nakamura et al.** and **Aharoni** disclose the invention as claimed.

Applicants' arguments related to the injection molding process as inappropriate to the epoxy material were noticed and accepted by examiner. However, **Nakamura et al.** clearly teach the injection molded thermoplastic material as appropriate and desirable substitute for epoxy while **Aharoni** teaches a process that allows to reduce the molding process temperature (a feature highly desirable for magnetic dives and small motors) while still achieving desired

physical characteristics of the product such as modulus of elasticity between 1.00-1.38 million psi.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., magnetic drive) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding the use of the disclosed materials in magnetic disc drive, examiner submits that this feature is now not cited by examiner as being irrelevant to the rejected claims. The use of motor structure disclosed by Katakura is not unique for the magnetic disc drives and may be used in spindle motors for other than disc drive applications. Furthermore, the term of "magnetic drive" is not necessary limited to the disc drives since there is a wide use of magnetic drives for pumps or washing machines. Regarding the use of fiberglass as disclosed by Aharoni in Table VII examiner submits that this data contains an exemplary composition that may not be used in other compositions (Re column 2, lines 60-68 and column 3, lines 1-11). Therefore, the combination is appropriate and discloses the spindle motor structure as claimed. However, examiner concurs with applicants' arguments concerning the use of the combined material in the spindle hard drive used in a hard drive. Therefore, the rejection of claims reciting the hard drive having the motor as disclosed in claim 1 is withdrawn.

Re claim 4, **Katakura et al.** disclose the support member secured in the base. The applicants' argued feature of a separate support member secured in the base is not recited in the claim. As a matter of fact no support member is recited in claim 1.

Re claim 10, **Katakura et al.** disclose the stator as claimed: a core 18 or 38 and windings 19 or 39 around the poles and the base plate 11 and 31 not being in contact with the stator. The support member is not a part of the spindle motor stator.

Re claim 58, the claim was erroneously omitted in the previous rejections. However the feature of the steel ferrule acting as a flux return ring was addressed under rejection of claim 17 that claim 58 depends of.

Re claims 49-51, see response to arguments related to claim 1 above.

Prior Art

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Waks whose telephone number is (703) 308-1676. The examiner can normally be reached on Monday through Thursday 8 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor R Ramirez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-1341 for regular communications and (703) 305-1341 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

JOSEPH WAKS
PRIMARY PATENT EXAMINER
TC-2800

JW
January 27, 2003